

Interactive comment on “Quantitative reconstruction of sea-surface conditions over the last ~150 yr in the Beaufort Sea based on dinoflagellate cyst assemblages: the role of large-scale atmospheric circulation patterns” by L. Durantou et al.

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Received and published: 31 July 2012

General comments

This is an important contribution to the knowledge about dinoflagellate cysts and surface water conditions in the Arctic. The manuscript presents interesting data which should be published. However, the manuscript suffers from not discussing the data with reference to relevant studies from similar regions (see comments below).

C2868

Discussion

In the discussion, the large-scale atmospheric circulation pattern and its influence on the precipitation, runoff and ocean circulation pattern is discussed. However, similar studies in other Arctic and subarctic regions are not referred to and discussed in relation to the data in the core. Recently published papers from such regions are Grøsfjeld et al. (2009) and Howe et al. (2010). For example, the occurrence of *Pentapharsodinium dalei* should be discussed in relation to the occurrence of this species in Rippfjorden (Howe et al. 2009). According to Howe et al. (2009) dinoflagellate cysts have been recovered from sediment trap samples taken from deployments in the Arctic-dominated Rippfjord, located in northern Svalbard, during 2006-2007. Its high export production is dominated by *Pentapharsodinium dalei* (92.3%) with minor amounts of round brown *Protoperidinium* cysts (3.6%) and *Spiniferites elongatus/frigidus* (2.9%) in the first instance and *Pentapharsodinium dalei* (98.2%) with minor amounts of *Spiniferites frigidus* (1.6%) in the second instance.

The data could also be discussed in relation to anthropogenic influence on the climate/environment. Natural versus anthropogenic influence is mentioned in both the abstract and the introduction. At least a few sentences concerning this aspect should also be included in the discussion.

The discussion part could perhaps be more clearly set out by introducing a few headings as suggested below:

Freshwater phases

The Pacific Decadal Oscillation (PDO)

The Arctic Oscillation (AO)

References to figures are lacking:

Page 72 68, line 334 (in the end of the sentence in lines 331-334) - insert (Fig. 4 d).
Page 7267, line 26 (end of sentence of lines 25-26) - insert (Fig. 4 c) .

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Recent dinocyst papers

Page 7260, line 9: Two more references (Grøsfjeld et al., Howe et al, 2010, see below) should be included here in the end of the introduction, as these are among the most recent work on distribution of dinocysts in seabed samples in Arctic and subarctic regions.

Page 7267, line 1: The second reference (Howe et al. 2009) should be added with respect to recent relevant information about *Pentapharsodinium dalei*.

Papers to be included in the list of references:

Grøsfjeld, K., Harland, R. & Howe, J., 2009. Dinoflagellate cyst assemblages inshore and offshore Svalbard reflecting their modern hydrography and climate. *Norwegian Journal of Geology* 89, 1-2, 121-134.

Howe, J. A., Harland, R., Cottier, F.R., Brand, T., Willis, K., Berge, J.R., Grøsfjeld, K. and Eriksson, A., 2010. Dinoflagellate cysts as proxies for palaeoceanographic conditions in Arctic fjords. In: Austin, W. E. N., Howe, J. et al. (Eds). *Fjordic Depositional Systems and Archives*, Geological Society, London, Special Publication 344, 61-74.

Figures, tables

A table listing all the recorded taxa should be included. Twenty four taxa are recorded. Only the most common taxa are mentioned in the text. As no table with data is presented, a table listing all the recorded taxa should be included.

Interactive comment on *Biogeosciences Discuss.*, 9, 7257, 2012.